

# MIDI

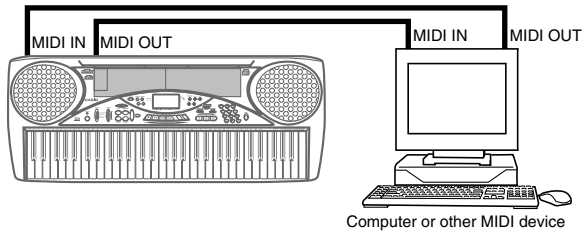
## What is MIDI?

The letters MIDI stand for Musical Instrument Digital Interface, which is the name of a worldwide standard for digital signals and connectors that makes it possible to exchange musical data between musical instruments and computers (machines) produced by different manufacturers. MIDI compatible equipment can exchange keyboard key press, key release, tone change, and other data as messages. Though you do not need any special knowledge about MIDI to use this keyboard as a stand-alone unit, MIDI operations require a bit of specialized knowledge. This section provides you with an overview of MIDI that will help to get you going.

## MIDI Connections

MIDI messages are sent out through the MIDI OUT terminal of one machine to the MIDI IN terminal of another machine over a MIDI cable. To send a message from this keyboard to another machine, for example, you must use a MIDI cable to connect the MIDI OUT terminal of this keyboard to the MIDI IN terminal of the other machine. To send MIDI messages back to this keyboard, you need to use a MIDI cable to connect the other machine's MIDI OUT terminal to the MIDI IN terminal of this keyboard.

To use a computer or other MIDI device to record and playback the MIDI data produced by this keyboard, you must connect the MIDI IN and MIDI OUT terminals of both machines in order send and receive data.

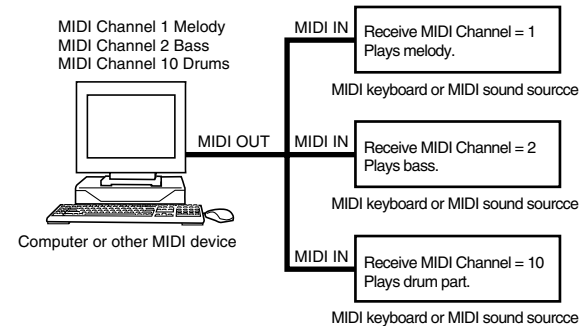


- To use the MIDI THRU function of a connected computer, sequencer, or other MIDI device, be sure to turn this keyboard's LOCAL CONTROL off (page E-37).

## MIDI Channels

MIDI allows you to send the data for multiple parts at the same time, with each part being sent over a separate MIDI channel. There are 16 MIDI channels, numbered 1 through 16, and MIDI channel data is always included whenever you exchange data (key press, pedal operation, etc.)

Both the sending machine and the receiving machine must be set to the same channel for the receiving unit to correctly receive and play data. If the receiving machine is set to Channel 2, for example, it receives only MIDI Channel 2 data, and all other channels are ignored.



This keyboard is equipped with multi-timbre capabilities, which means it can receive messages over all 16 MIDI channels and play up to 16 parts at the same time.

Keyboard and pedal operations performed on this keyboard are sent out by selecting a MIDI channel (1 to 16) and then sending the appropriate message.

## General MIDI

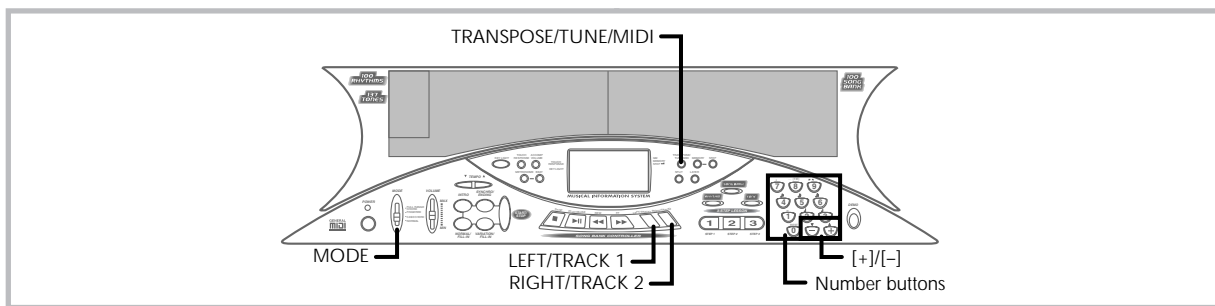
As we have already seen, MIDI makes it possible to exchange musical data between devices produced by different manufacturers. This musical data does not consist of the notes themselves, but rather information on whether a keyboard key is pressed or released, and the tone number.

If tone number 1 on a keyboard produced by Company A is PIANO while tone number 1 on a Company B's keyboard is BASS, for example, sending data from Company A's keyboard to Company B's keyboard produces a result entirely different from the original. If a computer, sequencer or other device with auto accompaniment capabilities is used to produce music data for the Company A keyboard which has 16 parts (16 channels) and then that data is sent to the Company B keyboard which can receive only 10 parts (10 channels), the parts that cannot be played will not be heard.

The standard for the tone numbering sequence, the number of pads, and other general factors that determine the sound source configuration, which was arrived at by mutual consultations by manufacturers, is called General MIDI.

The General MIDI standard defines the tone numbering sequence, the drum sound numbering sequence, the number of MIDI channels that can be used, and other general factors that determine the sound source configuration. Because of this, musical data produced on a General MIDI sound source can be played back using similar tones and identical nuances as the original, even when played on another manufacturer's sound source.

This keyboard conforms with General MIDI standards, so it can be connected to a computer or other device and used to play back General MIDI data that has been purchased, downloaded from the Internet, or obtained from any other source.



## Changing MIDI Settings

You can use this keyboard in combination with an external sequencer, synthesizer, or other MIDI device to play along with commercially available General MIDI software. This section tells you how to make the MIDI settings required when connecting to an external device.

### TRANSPOSE/TUNE/MIDI Button

Each press of the TRANSPOSE/TUNE/MIDI button cycles through a total of 12 setting screens: the transpose screen, the tuning screen, and 10 MIDI setting screens. If you accidentally pass the screen you want to use, keep pressing the TRANSPOSE/TUNE/MIDI button until the screen appears again. Also note that leaving a setting screen is automatically cleared from the display if you do not perform any operation for about five seconds.

### GM MODE (Default: Off)

**on:** This keyboard plays General MIDI data from a computer or other external device. MIDI IN CHORD JUDGE cannot be used when GM MODE is turned on.

**oFF:** MIDI IN CHORD JUDGE can be used.

1. Press the **TRANSPOSE/TUNE/MIDI button** until the GM MODE screen appears.  
*Example:* When GM MODE is turned off



2. Use the **[+]** and **[-]** or **[0]** and **[1]** buttons to turn the setting on and off.  
*Example:* To turn GM MODE on



### KEYBOARD CHANNEL

The keyboard channel is the channel used to send MIDI messages from this keyboard to an external device. You can specify one channel from 1 to 16 as the keyboard channel.

1. Press the **TRANSPOSE/TUNE/MIDI button** until the KEYBOARD CHANNEL screen appears.



2. Use the **[+]**, **[-]**, and the **number buttons** to change the channel number.  
*Example:* To specify channel 4



### NAVIGATE CHANNEL (Default: 4)

When MIDI messages are received from an external device for play on this keyboard, the navigate channel is the channel whose note data appears on the display and is used to light keyboard keys. You can select one channel from 1 to 8 as the navigate channel. Since this setting lets you use the data on any channel of commercially available MIDI software to light the keyboard keys, you can analyze how different parts of an arrangement are played.

1. Press the **TRANSPOSE/TUNE/MIDI button** until the NAVIGATE CHANNEL screen appears.



2. Use the **[+]**, **[-]**, and the **number buttons [1] through [8]** to change the channel number.  
*Example:* To specify channel 2



#### NOTE

The navigate channel automatically changes to 1 whenever you turn MIDI IN CHORD JUDGE.

#### To turn off specific sounds before playing back MIDI data that is being received

<<Navigate channel on/off>>

While playing MIDI data, press the **RIGHT/TRACK 2 button**.

- This cuts the sound of the navigate channel, but keyboard keys continue to light in accordance with the channel's data as it is received. Press **RIGHT/TRACK 2 button** again to turn the channel back on.

<<Next lower channel from navigate channel on/off>>

While playing MIDI data, press the **LEFT/TRACK 1 button**.

- This cuts the sound of the channel whose number is one less than the navigate channel, but keyboard keys continue to light in accordance with the channel's data as it is received. Press **LEFT/TRACK 1 button** again to turn the channel back on.

*Example:* If the navigate channel is channel 4, the above operation turns off channel 3. If the navigate channel is channel 1 or 2, the above operation turns off channel 8.

## MIDI IN CHORD JUDGE (Default: Off)

**on:** When a chord specification method is selected by the MODE switch, chords are specified by the keyboard channel note data input from the MIDI IN terminal.

**oFF:** MIDI IN CHORD JUDGE is turned off.

1. Press the **TRANSPOSE/TUNE/MIDI** button until the MIDI IN CHORD JUDGE screen appears.

oFF Chord

2. Use the **[+]** and **[-]** or **[0]** and **[1]** buttons to turn the setting on and off.

*Example:* To turn MIDI IN CHORD JUDGE on

on Chord

### NOTE

MIDI IN CHORD JUDGE automatically turns off whenever you change the navigate channel to any channel besides 01.

## LOCAL CONTROL (Default: On)

This setting determines whether or not the keyboard and sound source of this keyboard are connected internally. When recording to a computer or other external device connected to this keyboard's MIDI IN/OUT terminal, it helps if you turn LOCAL CONTROL off.

**on:** Anything played on the keyboard is sounded by the internal sound source and simultaneously output as a MIDI message from the MIDI OUT terminal.

**oFF:** Anything played on the keyboard is output as a MIDI message from the MIDI OUT terminal, without being sounded by the internal sound source. Turn LOCAL CONTROL off whenever you are using the MIDI THRU function of a computer or other external device. Also note that the no sound is produced by the keyboard if LOCAL CONTROL is turned off and no external device is connected.

1. Press the **TRANSPOSE/TUNE/MIDI** button until the LOCAL CONTROL screen appears.

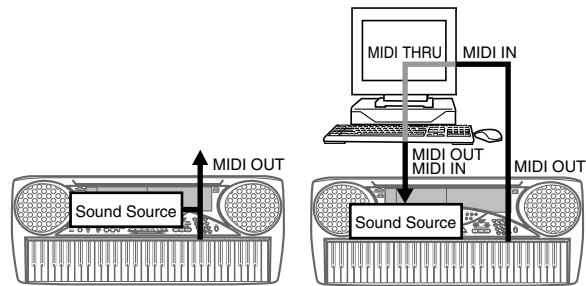
*Example:* When LOCAL CONTROL is on

on Local

2. Use the **[+]** and **[-]** or **[0]** and **[1]** buttons to turn the setting on and off.

*Example:* To turn LOCAL CONTROL off

oFF Local



### LOCAL CONTROL On

Notes played on the keyboard are sounded by the internal sound source and output as MIDI messages from the MIDI OUT terminal.

### LOCAL CONTROL Off

Notes played on the keyboard are output as MIDI messages from the MIDI OUT terminal, but not sounded directly by the internal sound source. The MIDI THRU terminal of the connected device can be used to return the MIDI message and sound it on this keyboard's sound source.

## ACCOMP MIDI OUT (Default: Off)

**on:** Auto Accompaniment is played by the keyboard and the corresponding MIDI message is output from the MIDI OUT terminal.

**oFF:** Auto Accompaniment MIDI messages are not output from the MIDI OUT terminal.

1. Press the **TRANSPOSE/TUNE/MIDI** button until the ACCOMP MIDI OUT screen appears.

*Example:* When ACCOMP MIDI OUT is off

oFF AcompOut

2. Use the **[+]** and **[-]** or **[0]** and **[1]** buttons to turn the setting on and off.

*Example:* To turn ACCOMP MIDI OUT on

on AcompOut

## TOUCH CURVE (Default: 0)

**0:** Normal touch curve

**1:** Louder than normal tone, even when little pressure is used to press keyboard keys. When touch response is turned off, sound is produced at a louder volume than normal.

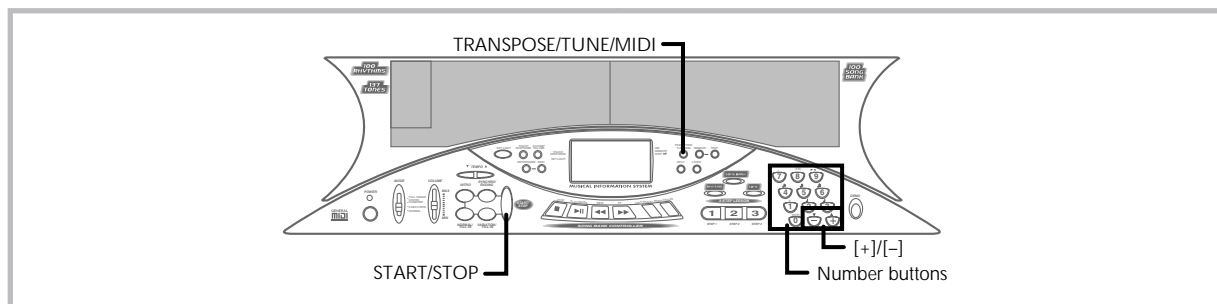
1. Press the **TRANSPOSE/TUNE/MIDI** button until the TOUCH CURVE SELECT screen appears.

0 Touch

2. Use the **[+]** and **[-]** or **[0]** and **[1]** buttons to change the setting.

*Example:* To select touch curve 1

1 Touch



## ASSIGNABLE JACK

**SUS(sustain):** Specifies a sustain\*<sup>1</sup> effect when the pedal is depressed.

**SoS (sostenuto):** Specifies a sostenuto\*<sup>2</sup> effect when the pedal is depressed.

**Sft (soft):** Specifies reduction of the sound's volume when the pedal is depressed.

**rHy (rhythm):** Specifies START/STOP button operation when the pedal is depressed.

1. Press the **TRANSPOSE/TUNE/MIDI button** until the **ASSIGNABLE JACK** screen appears.

*Example:* When sustain is currently set

**SUS Jack**

2. Use the **[+] and [-]** or **[0], [1], [2], and [3]** buttons to change the setting.

*Example:* To select rhythm

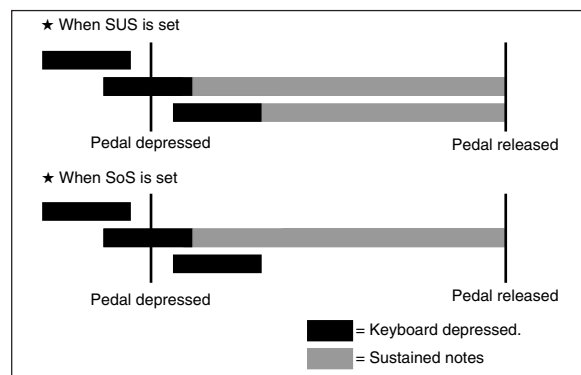
**rHy Jack**

### \*1 Sustain

With piano tones and other sounds that decay, the pedal acts as a damper pedal, with sounds being sustained longer when the pedal is depressed. With organ tones and other continuous sounds, notes played on the keyboard continue to sound until the pedal is released. In either case, the sustain effect is also applied to any notes that are played while the pedal is depressed.

### \*2 Sostenuto

This effect performs the same way as sustain, except that it is applied only to notes that are sounding already when the pedal is depressed. It does not affect notes that are played after the pedal is depressed.



## SOUND RANGE SHIFT (Default: On)

**on:** Shifts low range tones one octave lower and 072 PICCOLO one octave higher.

**oFF:** Plays low range tones and 072 PICCOLO at their normal levels.

1. Press the **TRANSPOSE/TUNE/MIDI button** until the **SOUND RANGE SHIFT** screen appears.

**on Shift**

2. Use the **[+] and [-]** or **[0]** and **[1]** buttons to change the setting.

*Example:* To turn SOUND RANGE SHIFT off

**oFF Shift**

## Messages

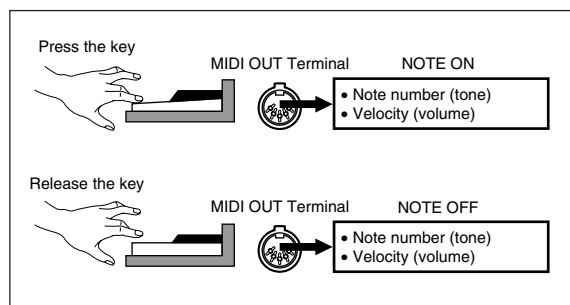
There is a wide variety of messages defined under the MIDI standard, and this section details the particular messages that can be sent and received by this keyboard. An asterisk is used to mark messages that affect the entire keyboard. Messages without an asterisk are those that affect only a particular channel.

### NOTE ON/OFF

This message sends data when a key is pressed (NOTE ON) or released (NOTE OFF).

A NOTE ON/OFF message include a note number (to indicate note whose key is being pressed or released) and velocity (keyboard pressure as a value from 1 to 127). NOTE ON velocity is always used to determine the relative volume of the note. This keyboard does not receive NOTE OFF velocity data.

Whenever you press or release a key on this keyboard, the corresponding NOTE ON or NOTE OFF message is sent from the MIDI OUT terminal.



### NOTE

The pitch of a note depends on the tone that is being used, as shown in the Note Table on page A-1. Whenever this keyboard receives a note number that is outside its range for that tone, the same tone in the nearest available octave is substituted.

## PROGRAM CHANGE

This is the tone selection message. PROGRAM CHANGE can contain tone data within the range of 0 to 127.

A PROGRAM CHANGE message is sent out through this keyboard's MIDI OUT terminal whenever you manually change its tone number. Receipt of a PROGRAM CHANGE message from an external machine changes the tone setting of this keyboard.

### NOTE

This keyboard supports 128 tones in the range 0 to 127. However, Channel 10 is a percussion-only channel, and Channels 0, 8, 16, 24, 25, 32, 40, 48, and 62 correspond to the nine drum set sounds of this keyboard.

## PITCH BEND

This message carries pitch bend information for smoothly sliding the pitch upwards or downwards during keyboard play. This keyboard does not send pitch bend data, but it can receive such data.

## CONTROL CHANGE

This message adds effects such as vibrato and volume changes applied during keyboard play. CONTROL CHANGE data includes a control number (to identify the effect type) and a control value (to specify the on/off status and depth of the effect).

The following is a list of data that can be send or received using CONTROL CHANGE.

Effect	Control Number
★ Modulation	1
★ Volume	7
★ Pan	10
★ Expression	11
Hold1	64
Sostenuto	66
Soft Pedal	67
RPN*	100 / 101
Data Entry	6 / 38

★ indicates receive-only messages

\* RPN stands for Registered Parameter Number, which is a special control change number used when combining multiple control changes. The parameter being controlled is selected using the control values of control numbers 100 and 101, and then settings are made using the control values of DATA ENTRY (control numbers 6 and 38).

This keyboard uses RPN to control this keyboard's pitch bend sense (pitch change width in accordance with bend data) from another external MIDI device, transpose (this keyboard's overall tuning adjusted in half-tone units), and tune (this keyboard's overall fine tuning).

### NOTE

Sustain (control number 64), sostenuto (control number 66), and soft (control number 67) effects applied using the foot pedal are also applied.

## ALL SOUND OFF

This message forces all sound being produced over the current channel to turn off, regardless of how the sound is being produced.

## ALL NOTES OFF

This message turns off all note data sent from an external device and currently being sounded on the channel.

- Any notes being sustained using a sustain pedal or sostenuto pedal continue to sound until the next pedal off.

## RESET ALL CONTROLLERS

This messages initializes pitch bend and all other control changes.

## SYSTEM EXCLUSIVE\*

This message is used to control system exclusives, which are tone fine adjustments that are unique to a particular machine. Originally, system exclusives were unique to a particular model, but now there are also universal system exclusives that are applicable to machines that are different models and even produced by different manufacturers.

The following are the system exclusive messages supported by this keyboard.

### GM SYSTEM ON ([F0][7E][7F][09][01][F7])

GM SYSTEM ON is used by an external machine to turn on this keyboard's GM system. GM stands for General MIDI.

- GM SYSTEM ON takes more time to process than other messages, so when GM SYSTEM ON is stored in the sequencer it can take more than 100msec until the next message.

### GM SYSTEM OFF ([F0][7E][7F][09][02][F7])

GM SYSTEM OFF is used by an external machine to turn off this keyboard's GM system.